



FIELAX Gesellschaft für wissenschaftliche Datenverarbeitung mbH  
Schleusenstr. 14, D-27568 Bremerhaven, GERMANY  
Phone: +49 (0) 471 30015 0, Fax: +49 (0) 471 30015 22  
Mail: info@fielax.de

# Salinity Data RV "Polarstern" ANT-XXIX/9 (PS82)

## Data Management Documentation

### Contents

<b>1</b>	<b>Cruise Summary</b>	<b>1</b>
<b>2</b>	<b>File Description</b>	<b>2</b>
<b>3</b>	<b>Statistical Analysis</b>	<b>3</b>
<b>4</b>	<b>Data Processing</b>	<b>4</b>
4.1	Workflow . . . . .	4
4.2	Offset Calculation . . . . .	5

Contact:

FIELAX Gesellschaft für wissenschaftliche Datenverarbeitung mbH  
Schleusenstr. 14, D-27568 Bremerhaven, GERMANY  
Phone: +49 (0) 471 30015 0, Fax: +49 (0) 471 30015 22  
Mail: info@fielax.de

Ref.: TSG-Report_PS82.pdf	Vers.: 1	Date: 2014/10/08	Status: final
---------------------------	----------	------------------	---------------



# 1 Cruise Summary

## Cruise specifications

Cruisename: ANT-XXIX/9 (PS82)  
Start of cruise: 19.12.2013 Cape Town  
End of cruise: 05.03.2014 Cape Town

## TSG Sensor specifications

Time period of TS data: 76 days  
First dataset: 19.12.2013, 00:00 UTC  
Last dataset: 05.03.2014, 00:00 UTC  
TS Bow Sensor SBE 21 Serial Number: 3189  
TS Keel Sensor SBE 21 Serial Number: 3354

## System diary

no special occurrences

## Comments

### TS Bow

19.12.2013, 00:00 UTC, TSB offline (until 26.12.2013, 08:20 UTC)  
29.12.2013, 04:00 UTC, TSB offline due to ice (until 22.02.2014, 08:20 UTC)  
01.03.2014, 06:46 UTC, Water sample deleted by spike filter

### TS Keel

24.12.2013, 13:24 UTC, Dship offline  
18.01.2014, 08:48 UTC, Water sample deleted by spike filter  
24.01.2014, 13:36 UTC, Water sample deleted by spike filter  
04.02.2014, 13:38 UTC, Water sample deleted by spike filter  
25.02.2014, 08:09 UTC, Water sample deleted by spike filter



## 2 File Description

### Salinometer

**\*.txt** Salinometer measurement of water samples, divided into processing sections (ASCII format)

**\*.cor** Correction of salinometer measurement of water samples, divided into processing sections (ASCII format)

### Thermosal

**MIW-Daten\_DWD/PS82.miw.dat** TSG data of entire cruise, 10 minutes interval (ASCII format, DSHIP extraction)

**Calib/PS82\_[sensor]\_DsNr[series]-[nr].dat** Filtered TSG data for calibration with water sample, 5 sec interval, 2 min period; data set number (DsNr) consists of series and number in salinometer data set (ASCII format)

**Calib/PS82\_[sensor]\_DsNr[series]-[nr].png** Diagram of filtering and averaging of TSG data for calibration with water sample; data set number (DsNr) consists of series and number in salinometer data set (Matlab graph, PNG format)

**PS82\_ConReportTSB[sensor].txt** Configuration report for SBE 21 TSG Bow (ASCII format)

**PS82\_ConReportTSK[sensor].txt** Configuration report for SBE 21 TSG Keel (ASCII format)

### Processing

**Salzkorrektur\_PS82\_[sensor].txt** Composition of salinometer measurements (ASCII format)

**Filtering\_PS82\_[sensor].txt** Offset calculation and filtering (ASCII format)

**PS82.cal** Offset information for correction of TSG data, product of salinometer calibration (ASCII format, MATLAB code)

**PS82\_miw.mat** TS data (10 minutes interval), offset corrected (MAT format)

**PS82\_miw\_despiked.mat** TSG data (10 min interval), final product (offset corrected and despiked, MAT format)

### Documentation

**TSG-Report\_PS82.pdf** Report about data processing (PDF format)

**Statistik.txt** Statistic analysis of the processed and despiked TS data (ASCII format)



### 3 Statistical Analysis

**Summary** Cruisename: PS82  
Filename: PS82\_miw  
Number of Values: 10945  
Speed Minimum for Data Filter: 0.5 kn

**NaN Values TS Bow** Temperature: 9233 (84.4 %)  
Salinity: 9233 (84.4 %)  
Conductivity: 9233 (84.4 %)

**NaN Values TS Keel** Temperature: 3438 (31.4 %)  
Salinity: 3438 (31.4 %)  
Conductivity: 3438 (31.4 %)

**Offset Correction TS Bow** Temperature: not corrected Value: 0°C  
Salinity: corrected Value: 0.0047 psu

**TS Keel** Temperature: not corrected Value: 0°C  
Salinity: corrected Value: 0.0329 psu

**Flags TS Bow** Temperature Conductivity  
Bit 1: # 9228 Bit 1: # 9228  
Bit 2: # 1 Bit 2: # 1  
Bit 3: # 3081 Bit 3: # 3081  
Bit 4: # 1 Bit 4: # 1  
Bit 5: # 1 Bit 5: # 1  
Bit 6: # 1 Bit 6: # 1  
Bit 7: # 1639 Bit 7: # 1639

**Flags TS Keel** Temperature Conductivity  
Bit 1: # 561 Bit 1: # 561  
Bit 2: # 1 Bit 2: # 1  
Bit 3: # 3081 Bit 3: # 3081  
Bit 4: # 1 Bit 4: # 1  
Bit 5: # 1 Bit 5: # 1  
Bit 6: # 2 Bit 6: # 2  
Bit 7: # 1639 Bit 7: # 1639

**Legend** Offset Correction Temperature: Sensor Calibration  
Offset Correction Salinity: Autosal Calibration  
Flags  
BIT 1: NULL weil keine Messung  
BIT 2: Wert auf NULL gesetzt weil Korrektur nicht moeglich  
BIT 3: Wert auf NULL gesetzt weil speed < 0.5 kn  
BIT 4: Wert auf NULL gesetzt weil Guete-Kriterium nicht erfuehlt  
BIT 5: Wert interpoliert weil Guete-Kriterium nicht erfuehlt oder BIT 1  
BIT 6: Wert suspekt weil T<T\_Gefrierpunkt  
BIT 7: Wert suspekt weil Dichte(TSK) < Dichte(TSB)



## 4 Data Processing

### 4.1 Workflow

The different steps of gathering and processing the data is visualized in fig. 1. While the TSG SBE21 sensors, which are situated in the vessel's keel and bow, measure the sea water temperature and conductivity (b), samples of the sea water in time intervals of one or two days are taken (a). The conductivity of these water samples is measured with the Optimare Precision Salinometer (c). By comparing the salinometer with the TSG SBE21 measurement, which is extracted from the DAVIS SHIP data base (d), the drifts of the TSG SBE21 sensors are calculated (e). To correct the sensor drifts of TSG SBE21 data, a constant offset is added to the data in the next processing step (f). Visual control and, if necessary, manual correction of the TSG SBE21 data (g) finalizes the processing.

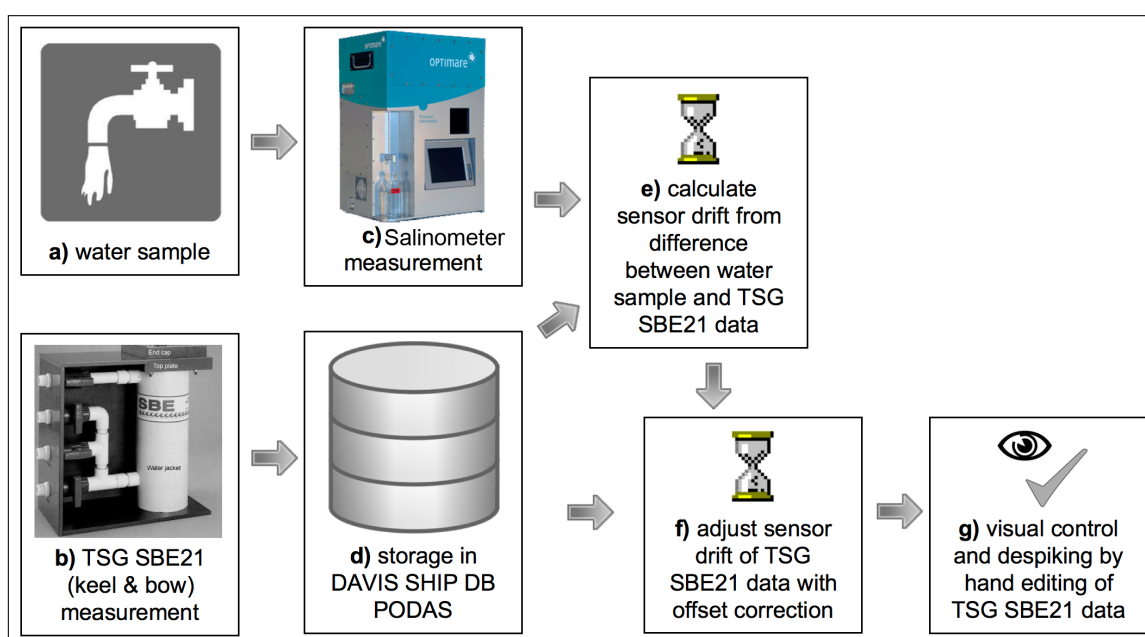


Figure 1: Workflow of TSG data processing



## 4.2 Offset Calculation

### TS Bow SBE21-3189

Number of water samples: 6  
1<sup>st</sup> Filtering - number of samples dropped out: 1  
2<sup>nd</sup> Filtering - number of samples dropped out: 0  
Final offset: 0.0047 psu  
Final standard deviation:  $\pm 0.00507$  psu

Full calculation is given in file 'Filtering\_PS82\_SBE21-3189-bow.txt' and shown in fig. 2.

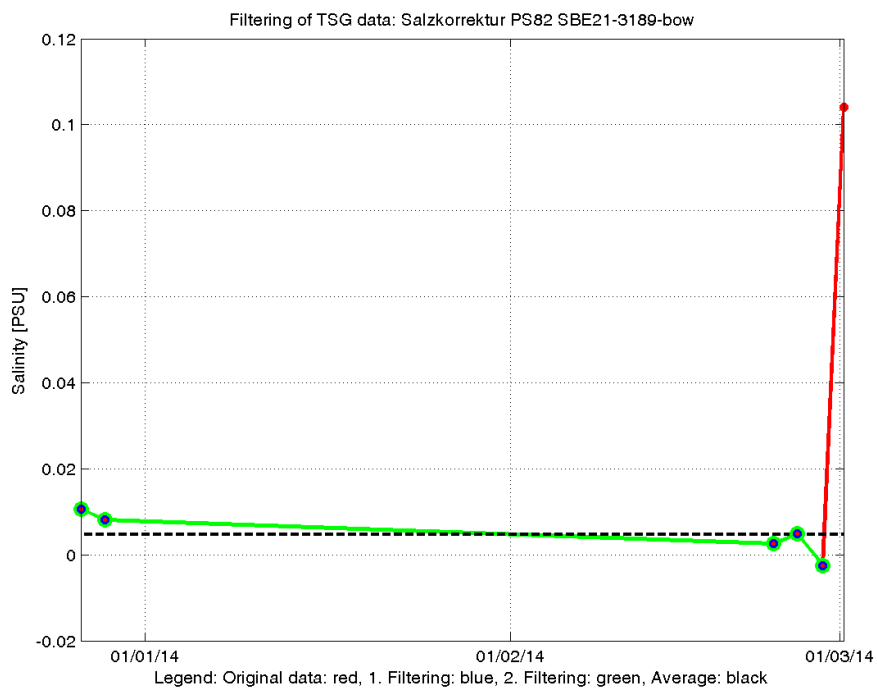


Figure 2: Filtering and Averaging of TSG Offset Bow Sensor



### TS Keel SBE21-3354

Number of water samples: 33  
1<sup>st</sup> Filtering - number of samples dropped out: 3  
2<sup>nd</sup> Filtering - number of samples dropped out: 2  
Final offset: 0.0329 psu  
Final standard deviation:  $\pm 0.00895$  psu

Full calculation is given in file 'Filtering\_PS82\_SBE21-3354-keel.txt' and shown in fig. 3.

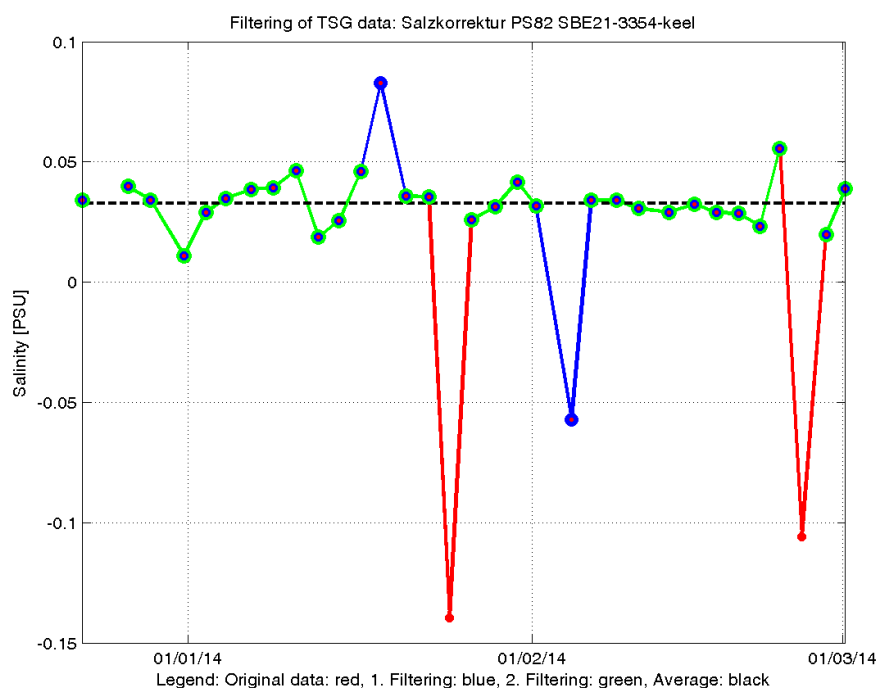


Figure 3: Filtering and Averaging of TSG Offset Keel Sensor